

# Costs and Returns Analysis Associated with Egg Production among Small Holder Poultry Farmers in Ngor Okpala Local Government Council of Imo State, Nigeria

Ahaotu, E.O<sup>1,2</sup>, Amanze, A. N<sup>3</sup>, Okwor, U.M<sup>4</sup> and Patricio R. De los Ríos-Escalante<sup>5, 6</sup>

<sup>1</sup>Department of Animal Sciences, University of Agriculture and Environmental Sciences, Umuagwo, 464115, Imo State, Nigeria.

<sup>2</sup>Department of Animal Production and Health Technology, Imo State Polytechnic, Umuagwo, 464115, Imo State, Nigeria.

<sup>3</sup>Department of Agricultural Extension, University of Agriculture and Environmental Sciences, Umuagwo, 464115, Imo State, Nigeria.

<sup>4</sup>Department of Agricultural Extension, University of Agriculture and Environmental Sciences, Umuagwo, 464115, Imo State, Nigeria.

<sup>5</sup>Department of Biological and Chemical Sciences, Faculty of Natural Resources, Catholic University of Temuco, Box 15-D, Temuco, 0211, Chile.

<sup>6</sup>UC Temuco Environmental Studies Center, Temuco, 0211, Chile.

Corresponding author: [emmanuel.ahaotu@uaes.edu.ng](mailto:emmanuel.ahaotu@uaes.edu.ng)

Received 25th November, 2025, Accepted 24th February 2026, Published 26th March, 2026

## Direct Research Journal of Agriculture and Food Science



Vol. 14(1), Pp. 152-159, March 2026

Author(s) retains the copyright of this article

This article is published under the terms of the Creative Commons Attribution License 4.0.

<https://journals.directresearchpublisher.org/index.php/drjafs>; <https://www.ajol.info/index.php/drjafs>

Research Article  
ISSN: 2354-4147

### ABSTRACT

*The costs and returns analysis associated with egg production among small holder poultry farmers in Ngor Okpala Local Government Council of Imo State, Nigeria was evaluated. Primary data were collected from 30 farmers drawn from the study area using multi stage, purposive and random sampling techniques. Analysis of data was carried out with the use of descriptive statistics, net income analysis and profitability ratios. The result revealed that majority of the farmers are male (76.67 %) and 83.33 % were married. Majority of the farmers 83.33 % had post primary education. 96.67 % of the small holder poultry farmers are in their active working age of between 21 and 60 years with most of them 90 % having over 5years experience in egg production with an average bird size of 268. The net income analysis indicated that an average farmer invested annually N1, 931,634.50 in poultry egg production with a total return of N 2,325,573.13. The gross margin and net income were N491, 557.63 and N393, 938.63 respectively. These figures suggest that egg production in the study area is a profitable venture. The result further revealed that disease outbreak, high cost of feed, high cost of vaccine and drugs, high mortality rate, egg spoilage and poor power supply were identified as the problems hindering egg production in the study area. The study therefore recommends that extension agents should intensify effort to educate small holder poultry farmers about improved management practices that will lead to reduction of disease outbreak and affordable drugs and vaccine should be made available to the farmers at a substituted price by government. Government should develop and enforce livestock feeds standards in order to protect farmers from dubious feed millers.*

**Keywords:** Costs, Returns, Egg Production, Net Farm Income, Small holder farmers



Citation Ahaotu, E.O, Amanze, A. N, Okwor, U.M and Patricio R. De los Ríos-Escalante (2026). Costs and Returns Analysis Associated with Egg Production among Small Holder Poultry Farmers in Ngor Okpala Local Government Council of Imo State, Nigeria. *Direct Research Journal of Agriculture and Food Science*. Vol. 14(1), Pp. 152-159 <https://doi.org/10.26765/DRJAFS25490754>

## INTRODUCTION

Potato Poultry are domesticated avian species that can be raised for eggs, meat and feathers. Poultry covers a wide range of birds, from indigenous and commercial breeds of chickens (fig. 1) to Muscovy ducks, mallard ducks (fig. 2), (Ahaotu *et al.*, 2017), turkeys (fig. 3), guinea fowl (fig. 4), geese (fig. 5), quail (fig. 6) and pheasants (fig 7). The poultry industry is important to the Nigerian economy because it provides a good source of meat and eggs which gives animal protein (Alionye *et al.*, 2020). Guineas are related to pheasants and are used as domestic poultry. Guinea fowls are popular on farms and homesteads because they keep down pest populations like ticks and slugs. They are also known for attacking snakes. Guinea fowl are distinct, ground-dwelling birds characterized by their dark grey or blackish plumage densely covered with white spots. They feature featherless, brightly colored heads often with a helmet-like crest. These birds typically measure 40–71 cm in length and are commonly seen foraging in flocks across rural farmyards, savannas, and grassland habitats. Proteins play key roles in the formation of a balanced human diet that is essential for better health, vigor, and productive capacity of the people (Ahaotu *et al.*, 2025a). Protein builds and repairs body tissues while deficiency of protein reduces the skillfulness of the young, hinders the development of the brain, retards rate of growth and increases rate of susceptibility to infections by animals (Ahaotu *et al.* 2020b). Food and Agricultural Organization of the United Nations stipulates a daily requirement of 65gm -75gm total protein, out of which 40% should be derived from animal protein. The average level of animal protein consumption in Nigeria is 15g/head/day which is grossly below the Food and Agricultural Organization recommended level of 35g/head/day (Ayo-Enwerem *et al.*, 2017).

Protein from livestock is said to be nutritionally superior to that of vegetable origin because it contains a complete range of amino acids that are essential for maintenance of health. Thus, protein from livestock is required to supplement those from vegetable origin to correct the serious imbalances in the nutritive value of the Nigerian diet which are dominated by foodstuffs rich in carbohydrate (Ahaotu *et al.*, 2024). The poultry sector is one of the most organized and vibrant segments of the agriculture industry in Nigeria. This sector generates direct and indirect employment and income for many people. The daily increased in population makes the demand so high. Pagani *et al.* (2008) stated that the Nigerian poultry sector, in spite of numerous problems such as a rise in the price of feed, avian influenza, the global financial crisis and inadequate credit, is still in expansion. This led to an increase in backyard and small-scale producers, particularly in urban and peri-urban zones, increasing the concentration of poultry and raising concern about human and poultry health. The poultry egg industry, apart from providing employment and a livelihood to thousands of people in Nigeria, also provides high quality, nutritious

food. The egg is a complete protein with excellent quality; one egg will give 6g of protein and egg-white protein has a biological value of 100, the highest biological value of any single protein (Ahaotu, 2024). Ahaotu *et al.* (2016) reported that eggs have many uses apart from domestic consumption in households; eggs are used in confectionery, bakery products, ice cream, and cosmetics. Egg shell is a good source of calcium for livestock feed formulation. Ahaotu *et al.*, (2025b) further estimated the gross margin of poultry egg production for three local government areas in Imo State, Nigeria as N70, 688.57. Ahaotu *et al.* (2023) however in their study reported an estimate of total fixed cost, less depreciation per layer bird of N208.88, total variable cost per bird of N331.62, total revenue from sales of egg and other sources per bird of N3,749.22 with gross margin per bird of N3,417.6 and net profit of N3,208.72. However, egg production in Nigeria fluctuates with unstable trends in the economy. These problems make it very difficult to expand the scale of production and new egg producers find it hard to start the business. Other problems that hinder egg production in Nigeria agricultural sector includes high cost of feed, outbreak of diseases and marketing problems (Ahaotu *et al.*, 2020a). This situation has forced many small-scale poultry farms to close down and those still managing to survive are producing at very high cost with very serious input limitation. In view of the above importance of egg this study aimed at investigating the costs and returns associated with egg production among small holder farmers in Ngor Okpala Local Government Council of Imo State, Nigeria.

## MATERIALS AND METHODS

### Description of the Study Area



**Figure 8:** Location Map of Ngor-Okpala Local Government Council, Imo State, Nigeria (Adopted from Ministry of Land and Survey, Owerri).

The study was conducted in Ngor Okpala Local Government of Imo State. Ngor Okpala is a Local Government Council of Imo State, Nigeria. (Figure 8) Its



**Table 1:** Distribution of respondents according to their age group

Age (Years)	Frequency	Percentage
< 21	1	3.33
1-30	4	13.33
31-40	5	16.67
41-50	12	40.00
51-60	8	26.67
> 60	0	0
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Survey, 2024

**Table 2:** Distribution of respondents according to their gender

Sex	Frequency	Percentage
Male	7	23.33
Female	23	76.67
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Survey, 2024

**Table 3:** Distribution of respondents according to their marital status

Marital Status	Frequency	Percentage
Married	25	83.33
Single	5	16.67
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Survey, 2024

**Table 4:** Distribution of respondents according to their educational level

Education Level	Frequency	Percentage
Primary	5	16.67
Secondary	19	63.33
Tertiary	6	20.00
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Survey, 2024

The result of age of the respondents is presented in (Table 1). The result showed that 40% of the small holder poultry farmers' falls between the age levels of 41-50 years, 26.67 % are between the age of 51-60years.16.67% fall between 31-40 years, 13.33% fall between 21-30 years and 3.33% are in the range of 11-20 years. The result showed that the majority of small holder poultry farmers (96.67%) are in their active working age of between 21 -60 years. hence age may likely have positive impact on egg production in the study area. Nkwocha *et al.*, (2025) reported that the age is a basic tool vital in agriculture because it determines the type of agricultural activities performed by the farmers.

### Gender of the Respondents

The result of the gender distribution of the respondents is presented in (Table 2). The result revealed that 76.67% of the small holder poultry keepers in the study area are female while 23.33% are male. These showed those females are more than male in keeping poultry birds at small scale.

### Marital Status of the Respondents

The result of marital status of the respondents is presented in (Table 3). The result indicated that 83.33% of the farmers are married while about 16.67% of them are single. This revealed that majority of the small holder poultry keepers are married. Marital status is expected since majority of the small holder poultry keepers are within the age range of 31 – 60 years which under African culture they are expected to be married and have family of their own.

### Educational Level of the Respondents

The result of the educational level of the respondents is presented in (Table 4). The result showed that 63.33% of the small holder poultry keepers have secondary level of education, 20% have tertiary certificate while 16.67% of them have primary school certificate. This showed that majority of the poultry farmers are educated. This implied that most of the famers can read and write which helped

**Table 5:** Distribution of respondents according to years of experience

Years of Experience	Frequency	Percentage
1-5	3	10.00
6-10	15	50.00
11-15	5	16.67
16-20	5	16.67
21-25	2	6.66
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Survey, 2024

**Table 6:** Distribution of respondents according to their occupation

Occupation	Frequency	Percentage
Crop Farmers	7	23.33
Traders	5	16.67
Artisans	6	20.00
Civil Servant	12	40.00
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Survey, 2024

**Table 7: Distribution of the Respondents according to Sources of Capital**

Source of Capital	Frequency	Percentage
Personal Savings	27	90.00
Loan from Bank	2	6.67
Loan from Cooperative	1	3.33
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Field Survey, 2024

them in interpreting recommended dosage of any drugs and vaccines, plus other feed supplements that need to be administered to the birds and can also follow standard feeding guide lines. The high level of education also leads to better management especially in the area of record keeping. Osuagwu and Ahaotu, (2025) observed that farmer's efficiency in using information on new production technique increases with education and thus, their productivity.

### Years of Experience of the Respondents

The result of years of experience of respondents is presented in (Table 5). The result revealed that 50% of the respondents have 5-10 years poultry production experience, 16.67% have 11-15 and 16-20 years of experience respectively, 10 % have 1-5years experience and 6.66 % of them have 21- 25 years poultry production experience respectively. This showed that about 90 % of the small holder poultry farmers have good knowledge of rearing a layer bird which had span for over 6 years and above.

### Occupation of the Respondents

The result of occupation of the respondents is presented in (Table 6). The result indicated that 40 % of the respondents are civil servants, 20 % are artisans, 16.67%

are traders, and 23.33 % of them practiced crop farming along with keeping poultry at their surroundings. This showed that 100 % of the small holder poultry farmers in the study area have other source of income along with the poultry farming which makes them a better risk bearer. This signified that the farmers have what to fall back on when there is outbreak of epidemic of birds such as disease infestation which might result into loss of capital.

### Sources of Capital to the Respondents

The result of sources of capital to the respondents is showed in (Table 7). The result revealed that about 90% of the egg producers sourced their capital through personal saving, 6.67% took loan from banks and 3.33% obtained loans from cooperatives. The implication of this result was that majority of farmers may not be able to go on large scale production since their sources of capital is majorly through personal savings. The result also revealed that most of the poultry keepers do not need to panic in term of financial losses since the initial capital was obtained from personal saving rather from taking credit facility.

### Size of Birds

The result of distribution of the respondents based on number of layer birds they possessed is presented in

**Table 8: Distribution of respondents according to size of Birds**

Number of Birds	Frequency	Percentage
1 – 100	3	10.00
101 - 200	6	20.00
201 – 300	8	26.67
301 - 400	9	30.00
401 – 500	3	10.00
>500	1	3.33
Total	30	100

Source. Field Survey, 2024

(Table 8). The result showed that about 30 % of the small holder poultry keepers have birds that ranged between 301- 400 in number, 226.67 % have 201 – 300-layer birds, 20 % have 101- 200 birds, 10 % of the keepers have 1-100 and 401 -500-layer birds respectively while only 3.33% of them have layer birds that are higher than 500. This clearly showed that the small holder poultry keepers are mainly small-scale producers. Ahaotu *et al.* (2018) stated that small holder poultry keepers rear fewer birds up to 350 birds in their farm. The average number of birds owned by small holder poultry keeper in the study area is about 268.

#### Estimated Mean Values of Costs and Returns Associated with Backyard Egg Production in the Study Area.

The mean costs and returns associated with small holder egg production is presented in Table 9. The result showed that a mean revenue of N2, 325,573.13 was estimated from an average of 268 birds. Mean total production cost of N1,931,634.50 was also estimated made up of mean fixed and variable costs of N 97,619.00 and N1,834,015.50 respectively given a mean gross margin and mean annual net farm income of N491,557.63 and N393,938.63 respectively for the thirty small holder egg producers in the study area. The result therefore revealed that egg production is profitable among the small holder poultry keepers in the study area. The result was in conformity with the findings of Ahaotu *et al.* (2023) who reported that egg production is profitable in Imo State, Nigeria with an average net farm income of N3,208.72 per bird which was higher than the net farm income value (N1,469.92) per bird estimated in this present study.

#### Profitability Ratios

In order to have a clearer picture of the performance of any enterprise, it is necessary to examine other measures of financial analysis such as, returns to the various factors of production inputs and other financial ratios. So, this study therefore considered some profitability ratios namely, gross, operating cost, return per capital invested, and rate of returns on investment and capital turnover ratios which were also computed in (Table 9). Gross ratio generally helps in measuring the overall financial success of a farm.

**Table 9: Costs, Returns and Profitability of Layer Production Enterprise**

Item	Amount (₦)	Percentage (%)
<b>Fixed Items (Depreciated)</b>		
Land	22,975.00	1.19
Building	55,000.00	2.85
Nest	3,500.00	0.18
Drinkers	2,422.50	0.12
Feeders	11,221.50	0.58
Egg trays	2,500.00	0.13
Total Fixed Cost (TFC)	97,619.00	5.05
<b>Variable Items</b>		
Day-old birds	56,280.00	2.91
Feed	1,526,073.00	79.00
Drugs/Vaccines	40,040.00	2.07
Wood shavings	8,567.50	0.44
Disinfectants	6,450.00	0.33
Water	6,990.00	0.36
Labor	180,000.00	9.32
Transport	9,615.00	0.50
Total Variable Cost (TVC)	1,834,015.50	94.95
Total Cost (TC)	1,931,634.50	100.00
<b>Revenue Items</b>		
Egg	1,940,096.67	-
Spent layer	302,400.00	-
Manure	83,076.46	-
Total Revenue (TR)	2,325,573.13	-
<b>Profitability Indicators</b>		
Gross Margin (GM = TR – TVC)	491,557.63	-
Net Farm Income [NFI = GM – TFC]	393,938.63	-
Net Farm Income per Bird	1,469.92	-
Gross Ratio (GR)	0.83	-
Operating Cost Ratio (OCR)	0.79	-
Return per Capital Invested (RPCI)	0.17	-
Capital Turnover (CTO)	1.20	-

Source: Field Survey, 2024

The gross ratio (GR) from the table is obtained by dividing the total farm costs (TFC) by the gross income (GI) and this was computed to be 0.83. The ratio reveals that the total farm costs was about 83% of the gross income. (Table 9) also captured the operating cost ratio (OCR) for the respondents in the study area and it was calculated by dividing the total variable cost (TVC) by the gross income (GI) and from the analysis it was found to be 0.79 (79%). This established the proportion of the gross income that goes to service the operating expense of the respondents and this is directly related to the farm variable input usage. The return per capital invested in this study was computed to be 0.17. This showed that for every one naira invested on egg production a return of 17 kobo is obtained which an indication that the investment is a worthy one. The capital turnover for the small holder poultry keepers was N1.20. The capital turnover values implied that for every naira invested in small scale poultry-egg production, N1.20 was returned to the farm as revenue. All the estimated values for the profitability ratio signified that small holder egg production in Ngor Okpala Local Government Council of Imo State, Nigeria is profitable.

#### Problems Militating Against Egg Production of Respondents

The result of the problem militating against egg production in the study area is presented in (table 10). The result revealed that 43.33 % of small holder poultry keepers identified climate change (Ahaotu *et al.*, 2019), diseases outbreak as a problem. Other problems affecting egg production in the study area are high cost of vaccine and drugs (20 %), high cost of feeds (13.33 %), while high mortality rate were identified as problems by 10 % of the farmers and 6.67% of the keepers identified poor power supply and egg spoilage as problem they encountered in egg production. This study revealed that diseases outbreak is the major significant factor that militates against egg production in the study area. The result of this study corresponded with the findings of Ahaotu *et al.* (2025b) that identified high cost of feed, high cost of vaccine and drugs as problems facing poultry egg production in Imo State, Nigeria. Similarly, the result was in line with Ahaotu *et al.* (2020) that identified high cost of feed and outbreak of diseases as problems that hinder egg production in Nigeria agricultural sector.

## Conclusion

This study revealed that small holder egg production is profitable in the study area with a net farm income of N1, 469.92 per bird. However, disease outbreak, high cost of feed, high cost of vaccine and drugs high mortality rate, egg spoilage and poor power supply were identified as the problems hindering egg production in the study area. The study therefore recommended that extension agents should intensify effort to educate poultry farmers about improved management practices that will lead to reduction of disease outbreak. Subsidized medications should be made available to the farmers by government. Government should develop and enforce livestock feeds standards in order to protect farmers from dubious feed millers.

## REFERENCES

- Ahaotu, E. O., Simeon-Ahaotu, V. C. and Herasymenko, N. V (2025a). Effects of Groundnut Shell Meal (GSM) on the Performance and Haematological Indices of Finisher Broilers. Direct Research Journal of Agriculture and Food Science. Vol. 13(2), Pp. 30-35.
- Ahaotu, E. O, Oparaajiaku, J. O, Umelo, C. Q and Osuagwu, C. O (2025b). Tephrosia vogelii and its Effectiveness on Ticks and Pests Control. UAES Journal of Innovative Sciences and Technology for Development (UJISTD). Volume 3, Issue 1, 2025 (pp. 132 - 145)
- Ahaotu E.O, Simeon-Ahaotu V.C., Oko E.C., Ikpe J.N, Olueze C.C., Edih M.C., Iheanacho R.A., Ukwuaba S.I and Nwabueze E.U (2024). Garlic Supplementation on Commercial Broiler Performance - A Review. 3<sup>rd</sup> International Scientific and Practical Internet Conference, May 9 - 10, 2024. FOP Marenichenko V.V., Dnipro, Ukraine. Pp. 4-10.
- Ahaotu, E.O (2024). Performance of Broiler Finisher Birds Fed with graded levels of *Azadirachta indica* leaf meal-based diets. Proceedings of the 1st International Scientific and Practical Internet Conference, March 14 - 15, 2024. FOP Marenichenko V.V., Dnipro, Ukraine. Pp. 4-9.
- Ahaotu E.O, Okoro C. N, Ukwuaba S.I, Nwokeforo C.U, Onuruka A.C, Ikpe J.N and Oko E.C (2023). Comparative Analysis and Efficiency of Poultry Enterprise in Ezinihitte Mbaise Local Government Council of Imo State, Nigeria. Merit Research Journal of Agricultural Science and Soil Sciences. 11 (4): 042-047.
- Ahaotu EO, Nwabueze E, Azubuike AP and Anyaegbu F (2020a). Evaluation of the Anti-Microbial and Anti-Inflammatory Properties of True Frangipani (*Plumeria Rubra*) for the Prevention and Treatment of Diseases in Animal Agriculture. Journal of Animal Husbandry and Dairy Science. 4(1): 1-6.
- Ahaotu EO, Adeyeye SA, Olueze CC, Akunna TO and Akinfemi A (2020b). Benefits and Widespread of External Parasites Infestation in Indigenous Chickens (*Gallus Gallus Domesticus*) A Study from Randomized States in Nigeria. Journal of Veterinary and Marine Sciences. 2 (3): 107-115.
- Ahaotu EO and Akagha NU (2020). Factors Affecting Adoption of Indigenous Strategies for Climate Change Adaptation in Imo State, Nigeria (A Survey Using Systematic Sampling of Households in Orlu Local Government Area). Acta Scientific Agriculture 4 (1): 49-55
- Ahaotu EO, Patricio De los Ríos, Ibe L.C and Singh, R.R (2019). Climate Change in Poultry Production System - A Review. Acta Scientific Agriculture 3 (9): 113-117.
- Ahaotu, E. O, Amajioyi, N and Okorie, K. C (2018). Sustainability of Guinea Fowl (*Numidia Meleagris*) Layers Fed varying Levels of *Centrosema Pubescent* Leaf Meal. Direct Res. J. Vet. Med. Anim. Sci. 3 (4): 28-35.
- Ahaotu, E. O., Ihenacho, R. A., Ike, A. and Ihenacho, A. C. (2017). Socio-economic and management practices of Duck in Imo State. A study of Orlu Local Government Area, Imo State, Nigeria. Direct Journal of Agriculture and Food Science. 5 (6): 250-255.
- Ahaotu, E.O, Anietie, E. M, Iwunze, F.C and Ihenacho, R.A (2016). Marketing of Poultry and Poultry Products in Itu Local Government Area of Akwa Ibom State, Nigeria. International Journal of Environmental and Agriculture Research (IJOEAR) 2(8): 93-95.
- Alionye, E.B, Ahaotu, E.O, Ihenacho, R.O and Chukwu, A.O (2020). Comparative Evaluation of Swine Production with Other Domestic Livestock in Mbaitolu Local Government Area of Imo State, Nigeria. Sustainability, Agri, Food and Environmental Research, (ISSN: 0719-3726), 8(4): 222-244.
- Ayo-Enwerem, M.C; Ahaotu, E.O; Nwogu, C. M. and Opara, J. (2017). Growth performance of starter broilers fed diets containing red sandalwood (*Pterocarpus santalinoides*) leaf meal. Direct Research Journal of Veterinary Medicine and Animal Science. Vol 2 (4): 106-109.
- Imo State Ministry of Lands and Survey (IMLS) (2017). Longitudes and Latitudes locations of Ngor Okpala Local Government Council of Imo State, Nigeria.
- Nkwocha, G.A, Ahaotu, E.O, Edih, M.C, Ugwuanyi, D.O, Ogwu, E.A and Iwuagwu, C.E (2025). Exploring the use of Bambara nut (*Vigna subterranean* (L) Verde) offal in finisher broiler chicken production. Interdisciplinary Journal of Agriculture and Environmental Sciences. 12 (2): 29 – 41.
- Osuagwu, C.O and Ahaotu, E.O (2025). Profitability of poultry egg marketers in Ezinihitte Mbaise local government council of Imo State, Nigeria. J. Vet. Res. Adv., 07(01): 43-46.
- Anyanwucho, R.A.I. (2000). "Fundamental of Economics in Africa." Fep. Publishers Ltd.
- Pagani, P., Abimiku, Y.J.E and Emeka-Okolie, W. (2008). Assessment of the Nigerian poultry market chain to improve biosecurity. FAO (Nigeria, Consultative Mission on Poultry) Study. November, 2008. Pp 1 – 65

Appendix



Fig. 1: Chickens

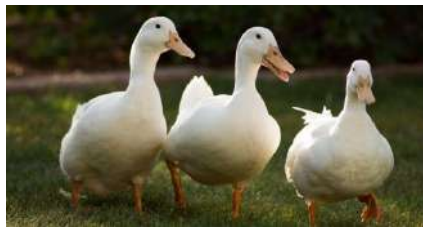


Fig. 2: Duck



Fig. 3: Turkeys



Fig. 4: Guinea fowl



Fig. 5: Geese



Fig. 6: Quail



Fig. 6: Pheasants